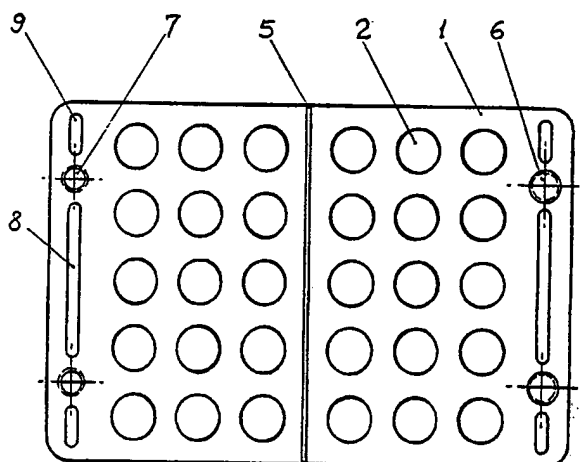




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(54) Title: IMPROVEMENTS IN BLISTER PACKS



(57) Abstract

A blister pack for tablets or capsules having a flexible plastic sheet (1) thermoformed to define a plurality of open faced pockets (2) each pocket being shaped to receive an individual tablet or capsule, the open faces of the pockets being closed by a sheet of aluminium foil heat sealed to the plastic sheet, characterised in that hinge means (5) are provided across the pack on a line about which the pack is substantially symmetrical, the two halves of the pack on either side of the hinge being adapted to be folded together with the area of aluminium foil of each said halves overlying the other whereby the aluminium foil is protected from accidental damage that might be caused by contact with a hard object, resealable fastening means (6, 7) being provided to maintain the pack in a folded configuration.

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IMPROVEMENTS IN BLISTER PACKS

Blister packs are now widely used for medicinal and food supplement tablets and capsules, whereby these tablets or capsules are contained between a normally transparent, flexible plastic sheet, thermoformed so as to define a plurality of pockets, with each pocket being just large enough to receive the shape of the individual tablet or capsule, and a flat aluminium foil, heat sealed to said plastic sheet.

The main advantage of this type of packaging is the extended shelf life, due to protection against oxygen and humidity, that it provides for these medicinal tablets and capsules, compared to conventional packaging in bottles and containers. With blister packaging, the tablet or capsule does not get exposed to external air and humidity until such time that the aluminium foil is broken. The aluminium foil is not supposed to be broken until just prior to the user ingesting the tablet or capsule.

In the case of conventional bottles and containers, all of the tablets or capsules inside that bottle or container are exposed to external air and humidity every time that the cap is taken off in order to take out just one of these tablets or capsules.

The second advantage of blister packs is the convenience to the user of being able to carry around in his or her pocket or handbag just one flat and light blister card of tablets instead of having to carry the whole bulky and heavy bottle. The need to carry tablets on one's person applies to many tablets, such as headache, anti-histamine, contraceptive, antacid, anti-inflammatory and heart tablets etc.

The object of this invention is to prevent the blister packs of tablets, pills and capsules from being accidentally damaged when individual blister cards are being carried around in pockets, handbags, briefcases,

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glove compartments etc. Such damage occurs frequently with the present form of blister cards, when other hard objects such as keys, coins, lipstick, pen, comb, spectacles etc., come into contact with the individual
5 blister card, punctures the frangible aluminium foil and thereby exposes the tablet or capsule to the external air, humidity and other contaminants.

The present invention consists in a blister pack for tablets or capsules comprising a flexible plastic sheet,
10 thermoformed to define a plurality of open faced pockets each pocket being shaped to receive an individual tablet or capsule, the open faces of the pockets being closed by a sheet of aluminium foil, heat sealed to the plastic sheet, characterised in that hinge means are provided
15 across the pack on a line about which the pack is substantially symmetrical, the two halves of the pack on either side of the hinge being adapted to be folded together with the area of aluminium foil of each said halves overlying the other, whereby the aluminium foil is
20 protected from accidental damage that might be caused by contact with a hard object, resealable fastening means being provided to maintain the pack in a folded configuration. It is preferred that the fastening means be formed integrally with the pack, separate fastening
25 means may however be provided.

It is preferred that the hinge means consists in a hinge groove formed by thermoforming and having cuts extending parallel to the groove on either side thereof, the depth of the groove and the lengths of the cuts being
30 selected in relation to the characteristics of the sheet so that when the sheet is folded about the hinge, parts thereof on either side of the hinge will each fold through 90° to lie flat against and in contact with the other part.

35 Without restricting the full scope of this invention,

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several preferred forms of this invention are illustrated in the following drawings:

Figure 1 is a plan view of a blister card with one creased or perforated hinge line and with two pairs of
5 press studs.

Figure 2 is a cross-sectional view of the blister card and aluminium foil of Figure 1 before being folded.

Figure 3 is an end elevational view of the blister card and aluminium foil of Figure 1.

10 Figure 4 is a part cross-sectional view and part side elevational view of the blister card of Figure 1 after being folded.

Figure 5 is a plan view of a blister card with a thermoformed hinge and two pairs of inter-locking cuts.

15 Figure 6 is a side elevational view of the blister card and aluminium foil of Figure 5 before being folded.

Figure 7 is an end elevational view of the blister card and aluminium foil of Figure 5, not showing the thermoformed hinge.

20 Figure 8 is a side elevational view of the blister card of Figure 5 after being folded.

Figure 9 is a plan view of a blister card with one hinge line and two pairs of alternative inter-locking cuts. Blister pockets are not shown.

25 Figure 10 is a plan view of a blister card with one hinge line and one pair of alternative inter-locking cuts. Blister pockets are not shown.

Figure 11 is a plan view of a blister card with two hinge lines and inter-locking edges.

30 Figure 12 is a side elevational view of the blister card and aluminium foil of Figure 11 before being folded.

Figure 13 is an end elevational view of the blister card and aluminium foil of Figure 11.

35 Figure 14 is a side elevational view of the blister card of Figure 11 after being folded.

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Figure 15 is a plan view of a blister card with a thermoformed hinge and key and groove fastening means.

Figure 16 is a side elevational view of the blister card and aluminium foil of Figure 15 before being folded.

5 Figure 17 is an end elevational view of the blister card and aluminium foil of Figure 15.

Figure 18 is a side elevational view of the blister card of Figure 15 after being folded.

10 Figure 19a is a plan view of a blister card with a thermoformed hinge, two key and groove fastening means, two pairs of opening tabs and four rows of blisters for tablets, each row holding seven tablets, one tablet for each day of the week.

15 Figure 19b is an end elevational view of the blister card of Figure 19a.

Figure 19c is a side elevational view of the blister card of Figure 19a before being folded.

Figure 19d is a side elevational view of the blister card of Figure 19a after being folded.

20 Figure 20a is a plan view of a blister card with tongue and cut-out fastening means.

Figure 20b is an end elevational view of the blister card of Figure 20a.

25 Figure 20c is a side elevational view of the blister card of Figure 20a with creased hinge before being folded.

Figure 20d is a side elevational view of the blister card of Figure 20a with thermoformed hinge before being folded.

30 Figure 20e is a side elevational view of the blister card of Figure 20a after being folded.

Figure 21a is a plan view of a blister card with a thermoformed hinge, two key and groove fastening means, one pair of opening tabs and stiffening ribs along the straight edges and rounded corners.

35 Figure 21b is an end elevational view of the blister

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card of Figure 21a.

Figure 21c is a side elevational view of the blister card of Figure 21a before being folded.

Figure 21d is a side elevational view of the blister
5 card of Figure 21a after being folded.

Figure 22 is a cross-sectional view through a thermoformed hinge where the hinge groove depth equals R, before folding.

Figure 23 is a cross-sectional view through the hinge
10 of Figure 22, after folding.

Figure 24 is a cross-sectional view through a thermoformed hinge where the hinge groove depth equals R+H, before folding.

Figure 25 is a cross-sectional view through the hinge
15 of Figure 24 after folding.

Figure 26 is a cross-sectional view through a hinge similar to hinge of Figure 24, but incorporating cuts on either side of the thermoformed groove, before folding.

Figure 27 is a cross-sectional view through the hinge
20 of Figure 26 after folding.

Figure 28 is a plan view of the hinge of Figure 26.

Figure 29 is a cross-sectional view through a thermoformed hinge where the hinge groove depth equals R+T before folding.

Figure 30 is a cross-sectional view through the hinge
25 of Figure 29, after folding.

The blister card 1 shown in Figures 1, 2, 3 and 4 comprises a sheet of flexible plastic material with a plurality of thermoformed blisters or pockets 2, suitably
30 shaped to receive either round tablets and pills or elongate capsules of medication 3. The tablets, pills or capsules are placed into these pockets and then covered with the aluminium foil 4 which is heat-sealed to the plastic sheet, in order to hermetically seal the
35 medication inside the pockets.

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The creased or perforated hinge line 5 divides the blister card into two equal halves and enables the blister card to be folded, as shown in Figure 4, with the two pairs of press studs 6 or 7 engaging and thereby securing the blister card in its folded state. When the blister card is folded, the frangible aluminium foil is protected against any accidental puncturing by other objects.

Ribs 8 and 9 along the edges of the blister card can be thermoformed into the plastic sheet in order to give the blister card some additional stiffness and flatness.

Figures 5, 6, 7 and 8 show another preferred form of the invention where instead of the above mentioned press studs there are a pair of inter-locking cuts 10 and 11 in the edges of the blister card parallel to the hinge line 12. The distance between the two cuts 10 is somewhat greater than the distance between the two cuts 11, so that when the blister card is folded and the edge between cuts 10 is pressed against the edge between cuts 11, the pliable edges will deform and inter-lock, thereby securing the blister card in its folded state, as shown in Figure 8.

The hinge 12 shown in Figure 5 is thermoformed into a slightly thinned out U-shape to facilitate the folding action.

One or more ribs 13 at right angles to the hinge line can be thermoformed into the plastic sheet in order to keep the blister card flatter before and after folding.

Figures 9 and 10 show two further examples of similar inter-locking cuts. There exist many different shapes of inter-locking cuts that will perform the same basic function of fastening the folded blister card.

Figures 11, 12, 13 and 14 show a blister card with two creased hinge lines 14. One of the card's edges parallel to the hinge lines is formed into a channel 15, so as to receive the plain edge 16 and secure it inside this channel when the blister card is folded. Multiple

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creased or thermoformed hinge lines assist the hinging action and also allow for some longitudinal movement between the two halves of the blister card when the abovementioned plain edge 16 is inserted into and
5 withdrawn from the channel shaped edge 15.

Figures 15, 16, 17 and 18 show another preferred form of the invention. The channel shaped hinge 17 is thermoformed and has thinned out walls to facilitate the folding action. A continuous groove 19 is formed along
10 the three edges of one half of the blister card. Two keys 18, formed in the other half of the blister card, engage groove 19 with a light friction fit when the blister card is folded. Grooves 19 and 20 and keys 18 give the two halves of the blister card added stiffness and flatness.
15 Tabs 21 facilitate opening of the folded card.

Figures 19a, 19b, 19c and 19d show another preferred form of the invention. In order to secure the folded blister card, the two thermoformed keys 22 in one half of the blister card press into the two thermoformed grooves
20 23 in the other half of the blister card. When opening the folded blister card, it is necessary to overcome the frictional resistance of the engaged keys 22 and grooves 23. The two pairs of tabs 24 and 25 are located close to the keys 22 and grooves 23 in order to help overcome said
25 frictional resistance with minimum distortion caused to the rest of the blister card. The ribs formed into the tabs 24 and 25 improve the finger gripping action of the tabs. Ribs 26 and 27 along the edges of the blister card are thermoformed into the plastic sheet in order to give
30 the blister card additional stiffness and flatness. The blister card has four rows of blisters for tablets, each row holding seven tablets, one tablet intended for each day of the week. The days of the week are printed adjacent to the corresponding blisters on the aluminium
35 foil that seals the blister card.

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Figures 20a, 20b, 20c, 20d and 20e show another preferred form of the invention. One half of the blister card incorporates a tongue 28 which engages the cut-out 29 in the other half of the blister card in order to secure the blister card in its folded state. Ribs 30 formed along the edges of the blister card give it additional stiffness and flatness. Figure 20c shows a double creased hinge 31 and alternative single creased hinge 32. Figure 20d shows a thermoformed hinge 33.

Figures 21a, 21b, 21c and 21d show another preferred form of the invention. The two thermoformed keys 34 in one half of the blister card press into the two thermoformed grooves 35 in the other half of the blister card. The thermoformed ribs 36 and 37 along the straight edges and rounded corners provide additional stiffness and flatness to the blister card.

The basic function of folding the individual blister card and fastening it in its folded state, in order to protect the frangible aluminium foil against damage, in all these preferred forms of the invention, is identical.

It may be necessary for the end-user to open and close the blister pack many times. Therefore the hinge must be durable and, at the same time, it must not be too stiff, so as not to distort the blister pack during folding.

The following methods can be used for the blister pack hinge construction:

- thermoforming a groove or grooves,
- perforating or cutting,
- creasing.

Thermoformed groove hinges can be formed into any plastic sheet, whatever the plastic polymer, e.g. polyvinyl chloride (PVC), polypropylene (PP), polystyrene (PS), acrylonitrile butadiene styrene (ABS), polyethylene terephthalate (PET) etc. or any co-extruded combination of

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layers of these polymers. However, unless the blister pack itself is very rigid as a result of a deep blister or blisters and/or stiffening ribs, these thermoformed groove hinges could be much too stiff and cause unacceptable distortion of the blister pack when it is folded through 180° .

Perforations are not suitable for all plastic polymers. E.g. if the blister pack is thermoformed from a relatively brittle material, such as PS, ABS or PVC, then a perforated hinge will break after only a few closing and opening actions.

Creased hinges are also only suitable for ductile polymers with long molecular chains, such as polypropylene or polyethylene.

The geometry and function of a thermoformed hinge are explained below:

The hinge groove 101 in Figure 22 has a depth that equals the radius R of the groove profile, before folding. The same hinge 102 in Figure 23, after folding through 180° , has reduced the radius of the groove profile from R to $1/2R$, as a result of the folding. Provided the two sides of this blister pack are rigid enough, as a result of deep blisters 103 and/or stiffening ribs, the folded blister pack will not be distorted and the two folded sides 104 will be parallel and will make contact along their full length, with no gap between them. However, if the two sides of the blister pack cannot be made rigid enough, due to the shallow configuration of the packaged product, then this hinge will be much too rigid and the blister pack will distort during and after folding.

In order to weaken the hinge's resistance to folding, the depth of the hinge groove 105 can be increased from R to $R+H$, as shown in Figure 24. The hinge resistance to folding is weakened primarily because the plastic sheet is

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thinned out further in the deeper groove during thermoforming. However, as a result of the geometrical change in groove profile, when this blister pack is being folded, the corners 106 will touch before the 180°

- 5 folding angle is being completed and before the two folded sides 107 have become parallel. When attempting to fold the blister pack by force beyond this touching point the blister pack will distort.

- 10 It is desirable to weaken the resistance to folding of the thermoformed groove hinge in order to prevent distortion of the folded blister pack and, at the same time, allow the two folded sides to be parallel and to make contact along their full length, substantially without gaps.

- 15 This is achieved by the incorporation of cuts 108, parallel and adjacent to the hinge groove 109, on either side of the groove, as shown in Figure 26 and Figure 28. These cuts weaken the hinge's resistance to folding and, at the same time, prevent the premature contact of the
- 20 corners 106 at a folding angle less than 180°, as was shown in Figure 25. The two folded sides 110 will be parallel and will make contact along their full length, substantially with no gap between them as shown in Figure 27.

- 25 Should, however, the combined lengths of these cuts 108, $L=L1 + L2 + L3$, be too great, thereby weakening the hinge's resistance to folding by too much, then the contact of the two sides 111 of the folded blister pack will be delayed past the 180° and the blister pack will
- 30 develop a gap 112, as shown in Figure 30 and the two folded sides 111 will, once again, not be parallel and will not make contact along their full length.

- Increasing the combined lengths of cuts L and/or increasing the depth of the hinge groove will weaken the
- 35 hinge's resistance to folding and vice versa.

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Increasing the combined lengths of cuts L and/or reducing the depth of the hinge groove, as shown in Figure 29, where $R+T(R+H)$, will delay the contact of the two sides of the blister pack beyond the folding angle of 180° and they will not be parallel and will not make contact along their full length, as shown in Figure 30.

Consequently, by correctly balancing the increased hinge groove depth with the combined lengths of cuts L, the hinge will not be too stiff and therefore will not distort the blister pack and, at the same time, the two sides of the blister pack will fold to 180° and be parallel and make contact along their full length.

To achieve the above mentioned balance, the type of plastic polymer and the sheet thickness must be taken into consideration. E.g. for 0,37 mm thick PVC sheet, groove radius $R = 2,75$ mm, groove depth $R+H = 4$ mm and a hinge length of 82 mm, the combined cut lengths $L = 22$ mm, or $L = 27$ mm per 100 mm of hinge length.

The individual cut lengths $L_1, L_2, \dots L_n$ do not have to be equal. They can be varied in length to suit the size and location of the blisters on the blister pack, as shown in Figure 28, so as to improve flatness of the folded blister pack in its direction of length and width.

Any one of the various forms of hinge may be used in conjunction with any one of the forms of fastening means described above.

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CLAIMS:-

1. A blister pack for tablets or capsules comprising a flexible plastic sheet thermoformed to define a plurality of open faced pockets each pocket being shaped to receive
5 an individual tablet or capsule, the open faces of the pockets being closed by a sheet of aluminium foil heat sealed to the plastic sheet, characterised in that hinge means are provided across the pack on a line about which the pack is substantially symmetrical, the two halves of
10 the pack on either side of the hinge being adapted to be folded together with the area of aluminium foil of each said halves overlying the other whereby the aluminium foil is protected from accidental damage that might be caused by contact with a hard object, resealable fastening means
15 being provided to maintain the pack in a folded configuration.
2. A blister pack as claimed in Claim 1 wherein the hinge means consists in a hinge groove formed by thermoforming and having cuts extending parallel to the
20 groove on either side thereof, the depth of the groove and the lengths of the cuts being selected in relation to the characteristics of the sheet so that when the sheet is folded about the hinge, parts thereof on either side of the hinge will each fold through 90° to lie flat against
25 and in contact with the other part.
3. A blister pack as claimed in claim 1 or claim 2 wherein the said resealable fastening means consists in protrusion from one half of the sheet arranged to engage frictionally within cavities formed in the other half.
- 30 4. A blister pack as claimed in claim 1 or claim 2 wherein the said resealable fastening means consists in cuts formed in the card constructed and arranged so that the edges thereof interlock when the card is folded to maintain the card in a folded condition.

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5. A blister pack as claimed in claim 1 or claim 2 or claim 3 wherein the said resealable means is not an integral part of said plastic sheet.

AMENDED CLAIMS

[received by the International Bureau on 28 May 1993 (28.05.93);
original claim 1 amended; other claims unchanged (2 pages)]

1. A blister pack for tablets or capsules, impervious to humidity and oxygen, comprising a flexible plastic sheet thermoformed to define a plurality of open faced pockets
5 each pocket being shaped to receive an individual tablet or capsule, the open faces of the pockets being closed by a sheet of aluminium foil heat sealed to the plastic sheet, characterised in that hinge means are provided across the pack on a line about which the pack is
10 substantially symmetrical, the two halves of the pack on either side of the hinge being adapted to be folded together from an open configuration in which a tablet or capsule can be removed from the pack to a closed configuration in which the area of aluminium foil of each
15 of said halves overlies the other whereby the aluminium foil is protected from accidental damage that might be caused by contact with a hard object, removal of a tablet or capsule being possible only when the halves of the pack are hinged to the open configuration, resealable fastening
20 means being provided to maintain the pack in the closed protected configuration, the said hinge means and releasable fastening means being constructed and arranged to allow repeated opening and closing of the pack to permit removal of individual tablets or capsules in
25 succession.
2. A blister pack as claimed in Claim 1 wherein the hinge means consists in a hinge groove formed by thermoforming and having cuts extending parallel to the
30 the lengths of the cuts being selected in relation to the characteristics of the sheet so that when the sheet is folded about the hinge, parts thereof on either side of the hinge will each fold through 90° to lie flat against and in contact with the other part.
- 35 3. A blister pack as claimed in claim 1 or claim 2

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wherein the said resealable fastening means consists in protrusion from one half of the sheet arranged to engage frictionally within cavities formed in the other half.

4. A blister pack as claimed in claim 1 or claim 2

5 wherein the said resealable fastening means consists in cuts formed in the card constructed and arranged so that the edges thereof interlock when the card is folded to maintain the card in a folded condition.

5. A blister pack as claimed in claim 1 or claim 2 or
10 claim 3 wherein the said resealable means is not an integral part of said plastic sheet.

STATEMENT UNDER ARTICLE 19

The documents considered to be relevant in the International Search Report have been carefully considered and as a result an amended claim 1 has been proposed.

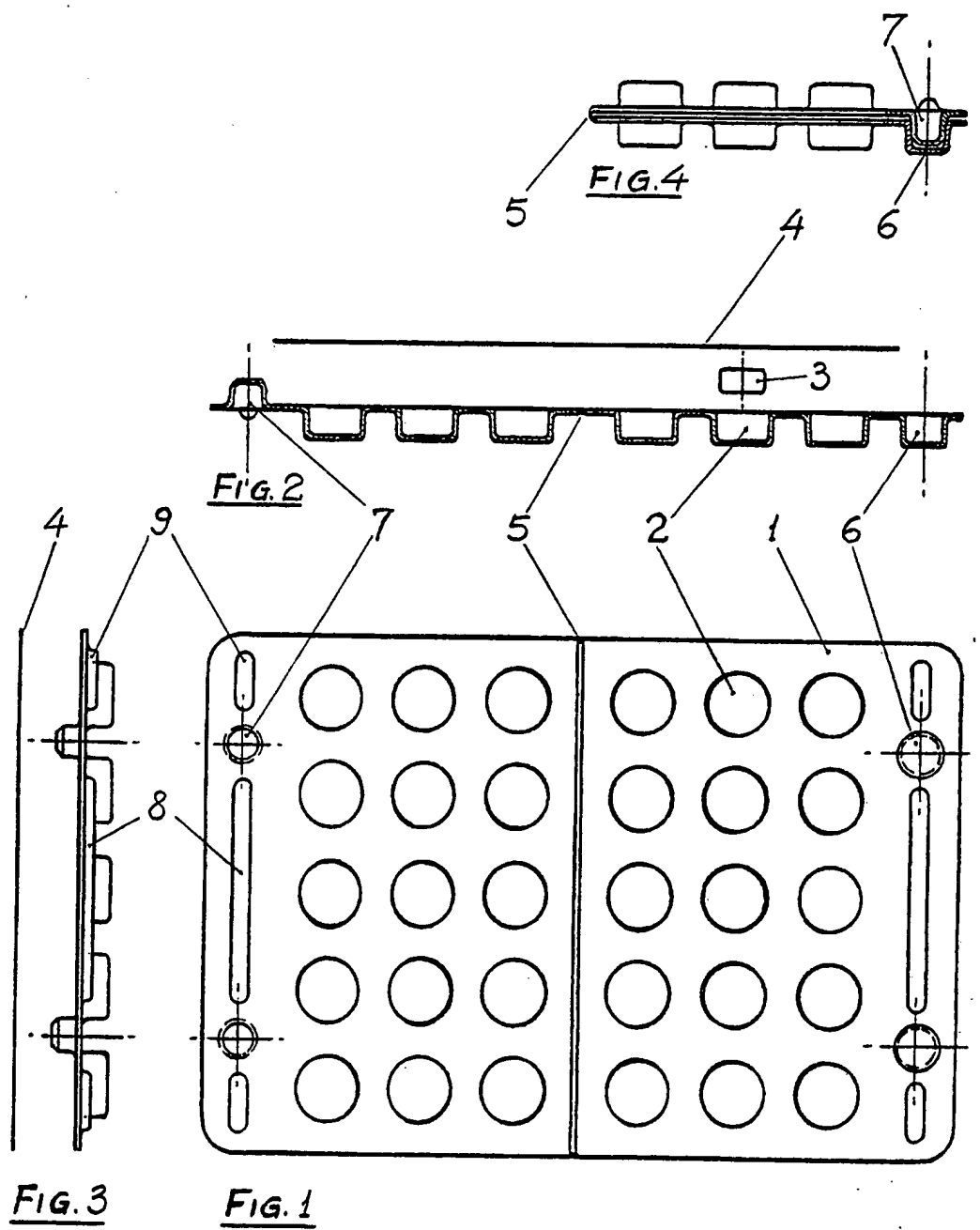
While the claim as it stands is considered to be clearly distinguished from the documents considered to be relevant in categories X and Y, amendments have been proposed to emphasise the distinction.

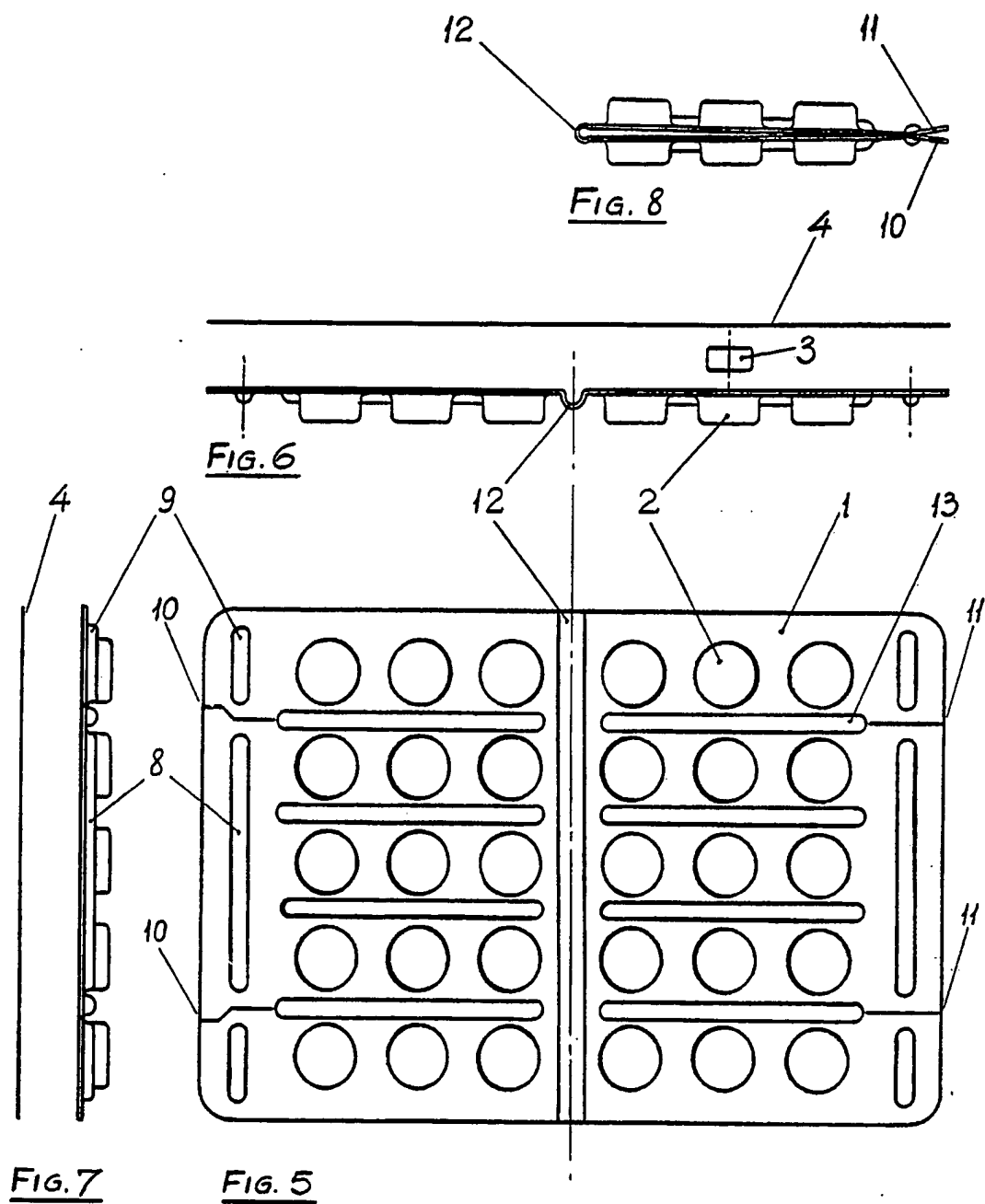
Considering first DE,A1,4014811 (Orbke), the invention described in this specification represents an entirely different concept from that of the present invention. Firstly, what is described and illustrated does not come within the scope of the claims in that there is no flexible plastic sheet thermoformed to define a plurality of open faced pockets, each to receive an individual tablet or capsule, nor are the open faces of pockets closed by a sheet of aluminium foil heat sealed to the plastic sheet.

The main difference, however, lies in the fact that in the present invention the hinge has an essential function effective throughout the life of the package enabling it to be opened and closed, the package having releasable fastening means to enable this to be done. In the cited specification, there is no hinge in the sense of the present specification. In one form of the cited invention a foldable blank is used the parts of which are held together permanently by glueing or sealing. There is no necessity for or disclosure of the use of a hinge to permit opening and closing of the container.

The remarks set out above apply also to DE,A1,4101265 which is also not relevant on account of the fact that it was published after the priority date claimed.

GB,757642 (Cole Ltd) is not relevant either for reasons similar to those given above. In the construction described, the hinge plays no part in the operation of the container. Once the container is closed, subsequent opening is effected without recourse to the hinge. In the configuration illustrated in Figure 5 permitting the removal of the contents, the hinge remains in substantially the same state as illustrated in Figure 4.





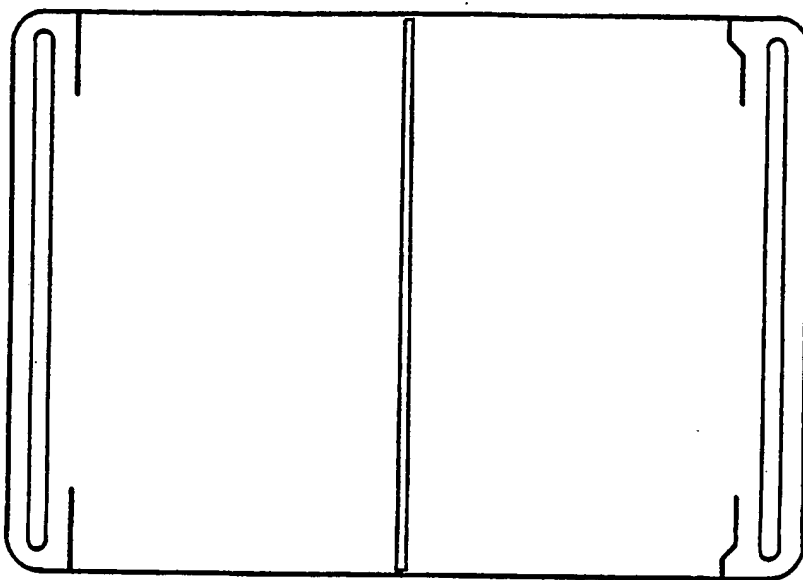


Fig. 9

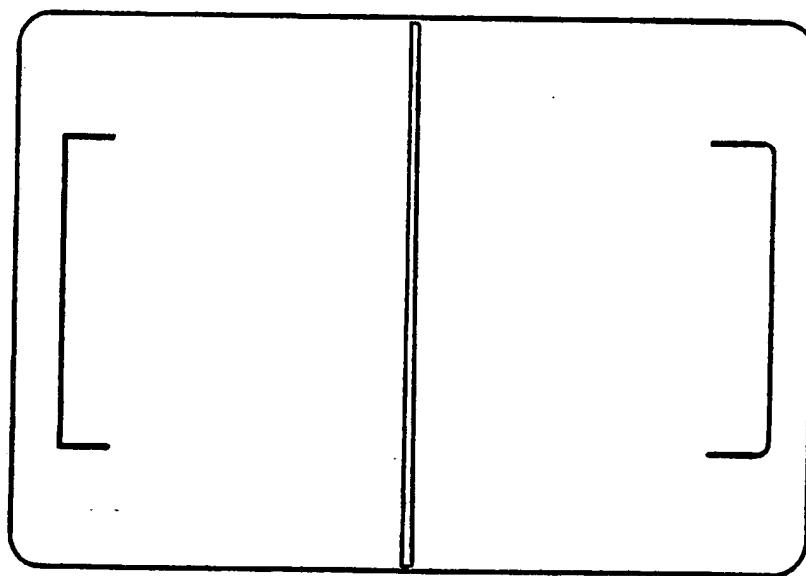
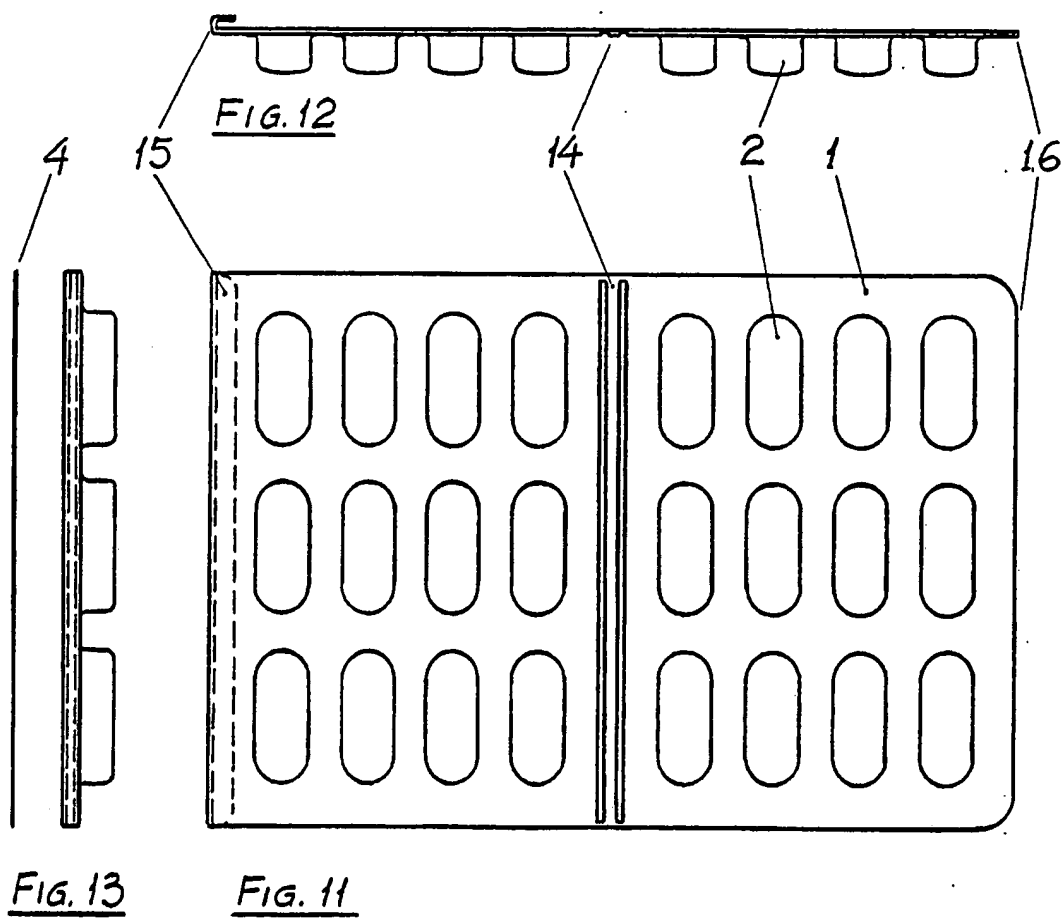
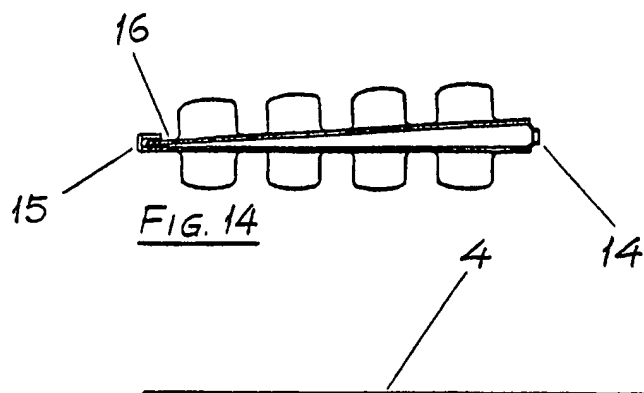
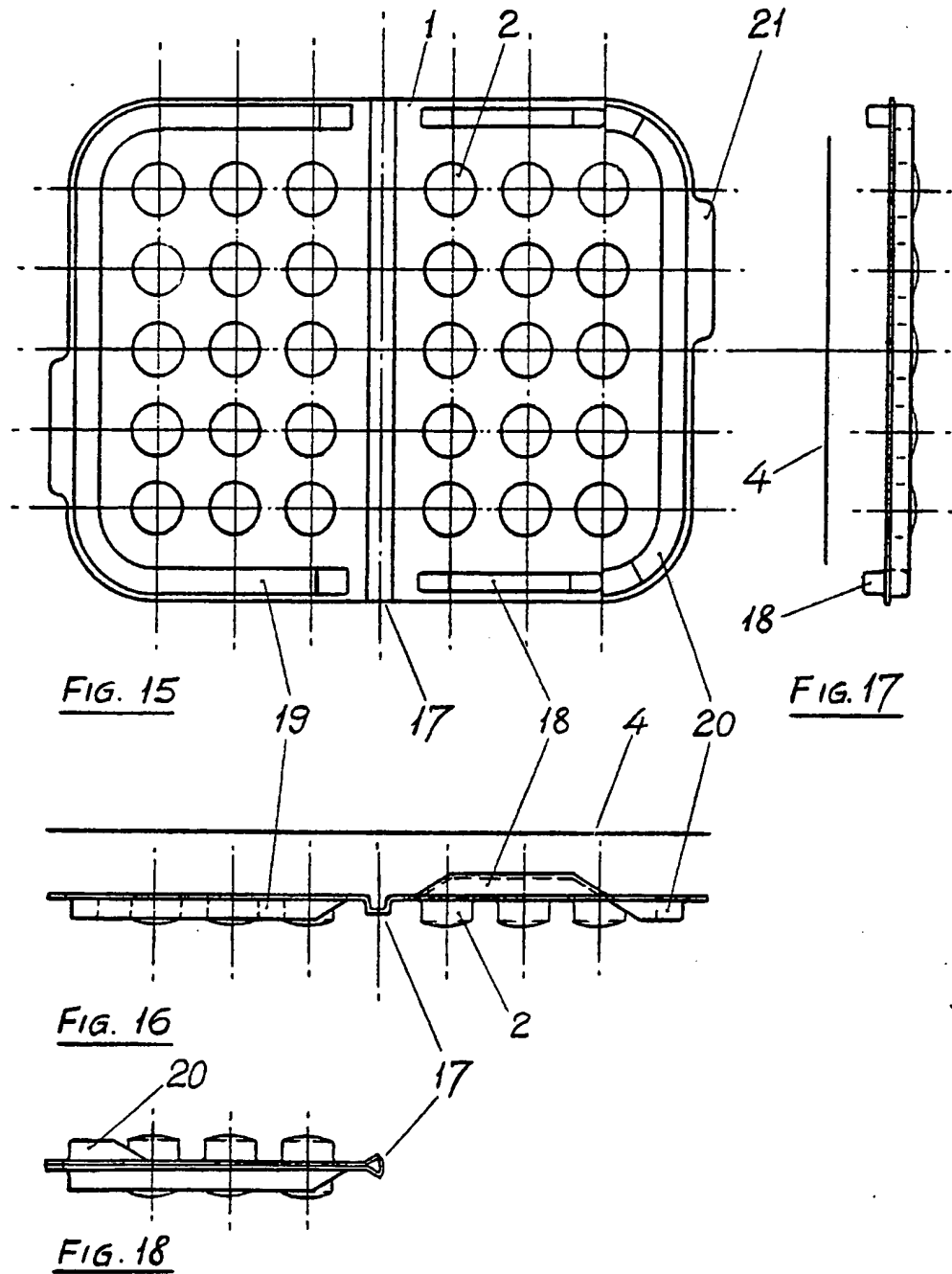
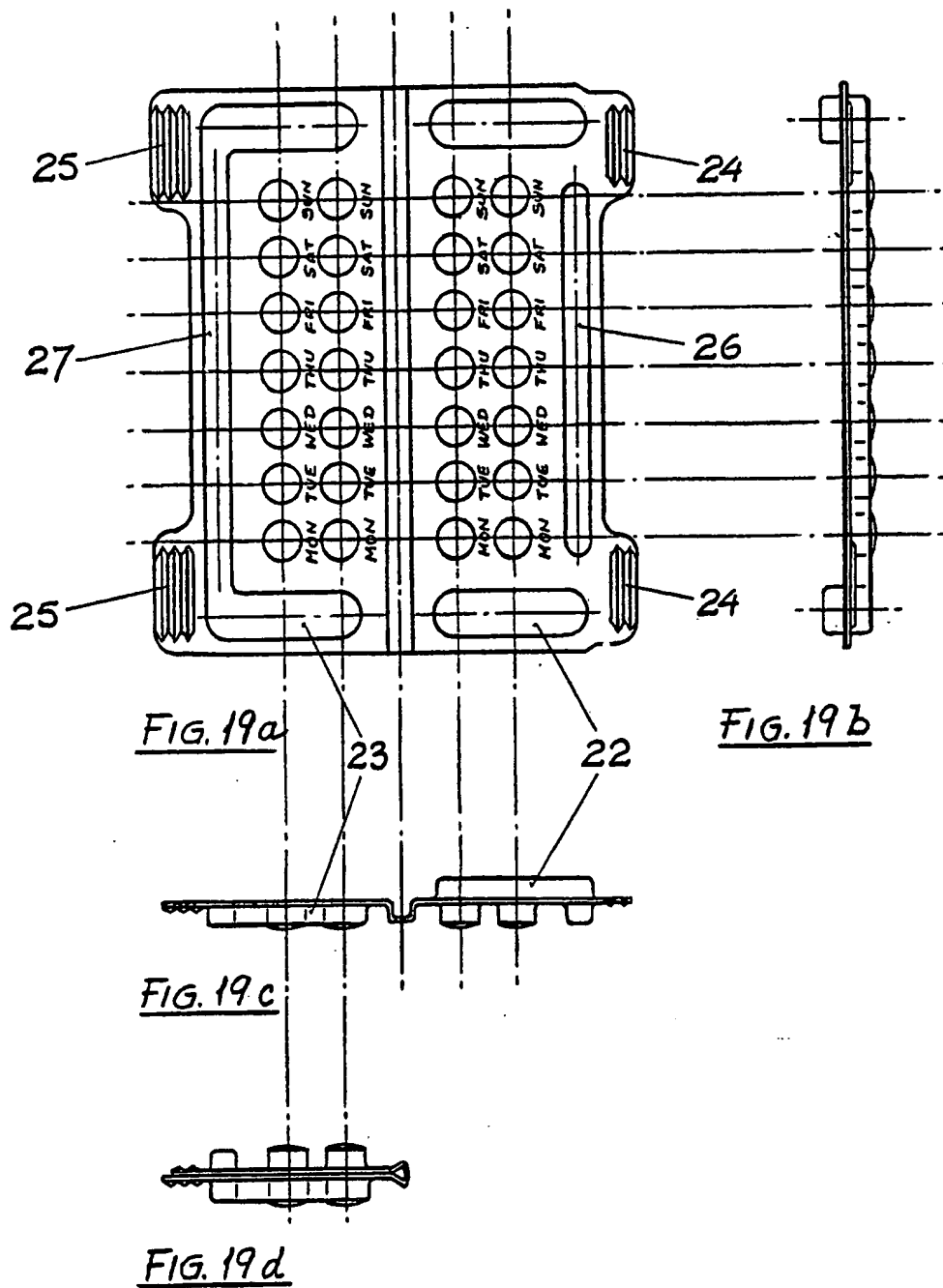


Fig. 10

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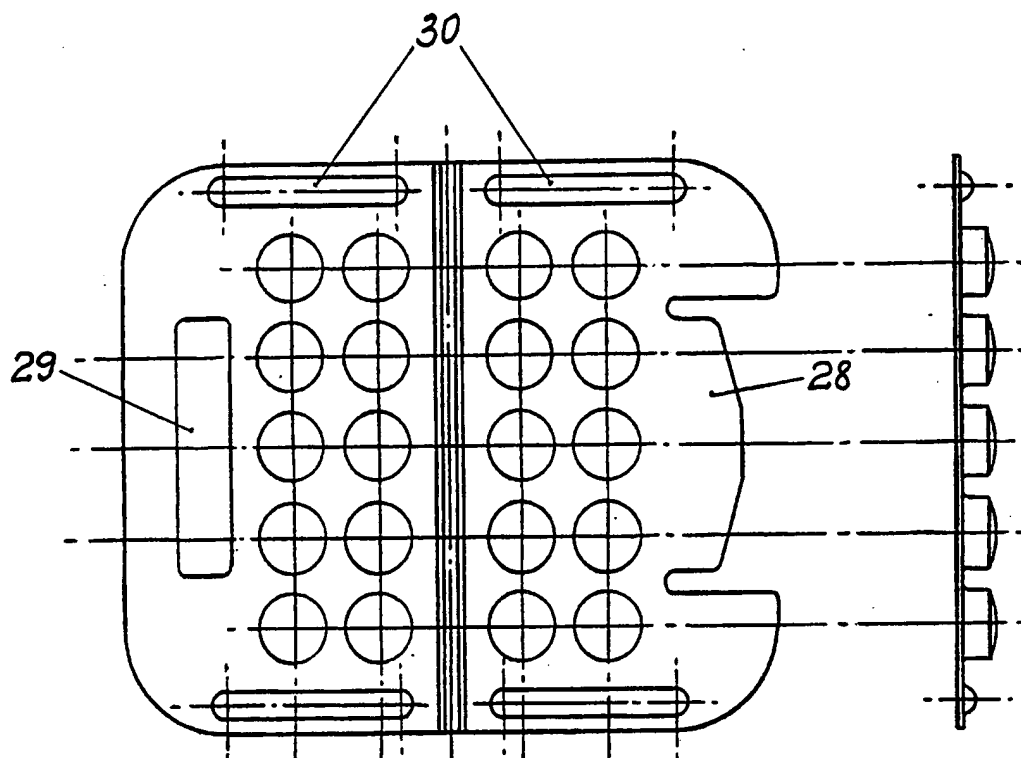


FIG. 20 a

FIG. 20 b

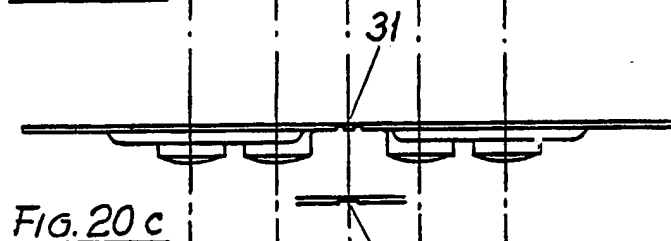


FIG. 20 c

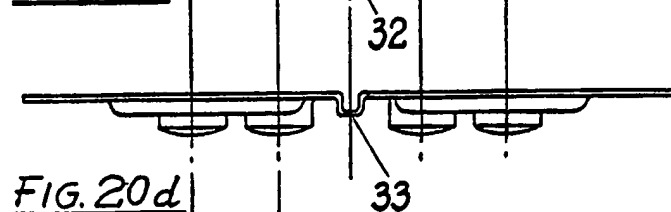


FIG. 20 d

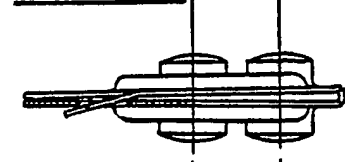
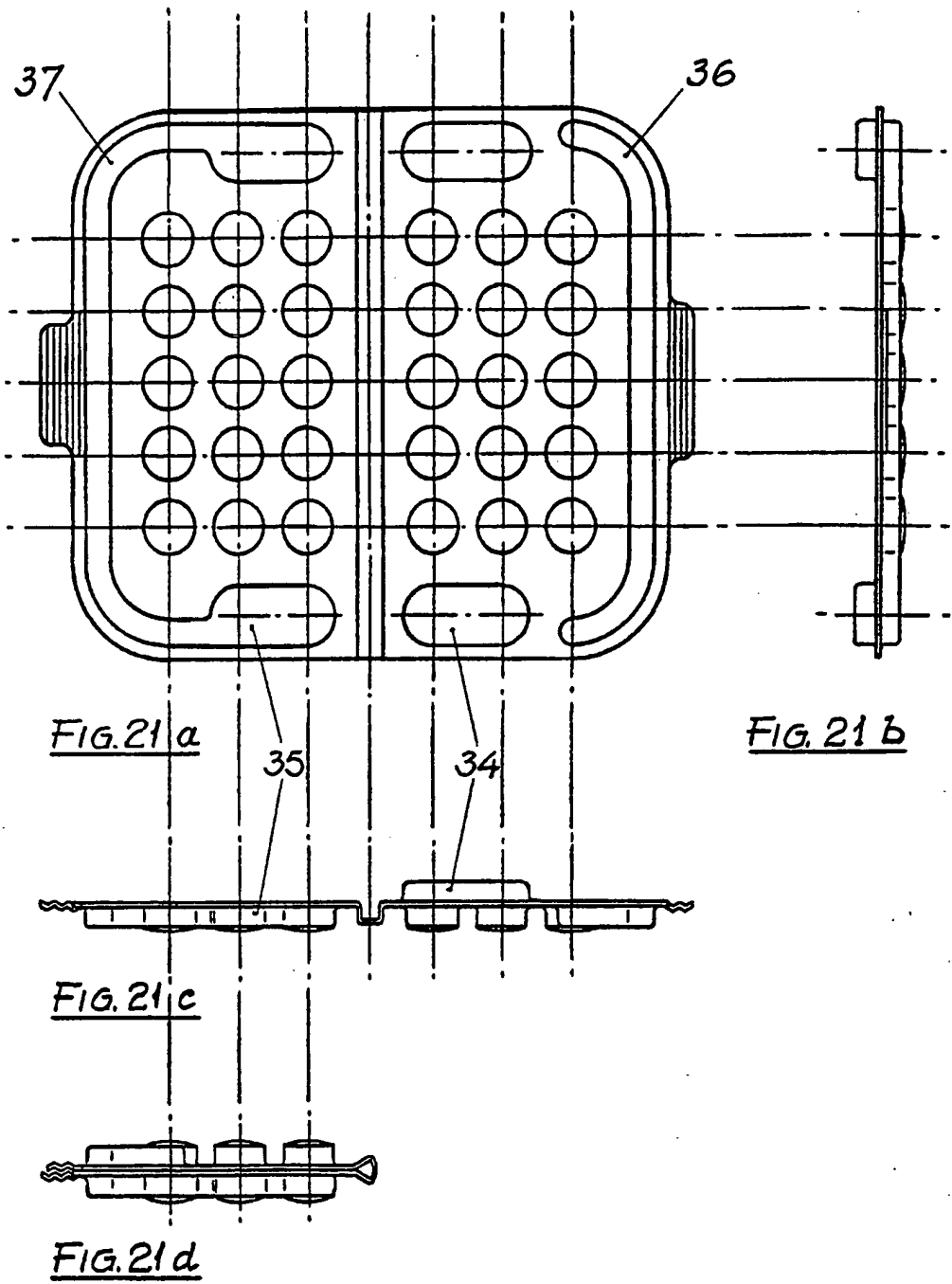


FIG. 20 e

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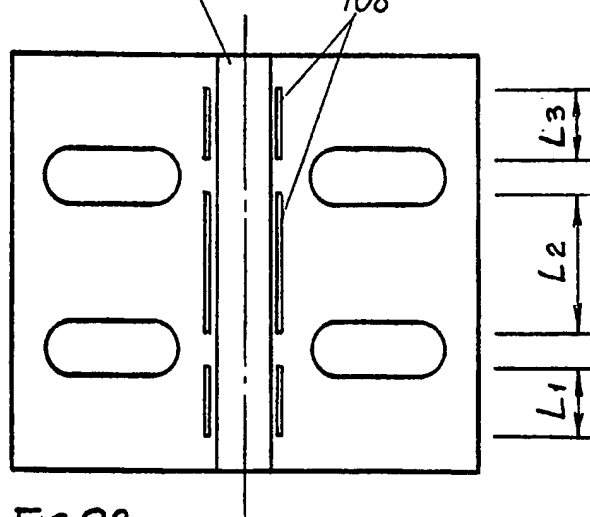
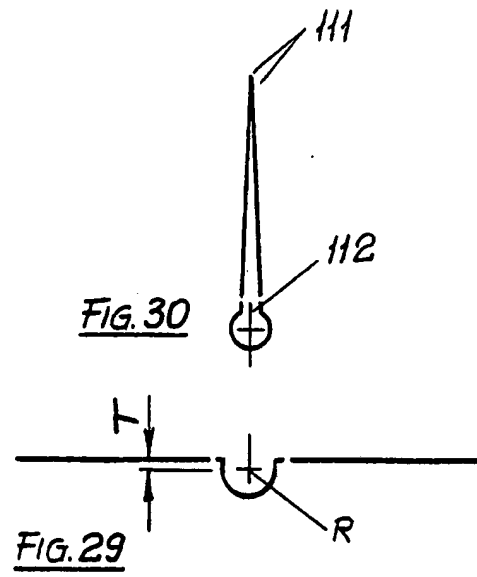
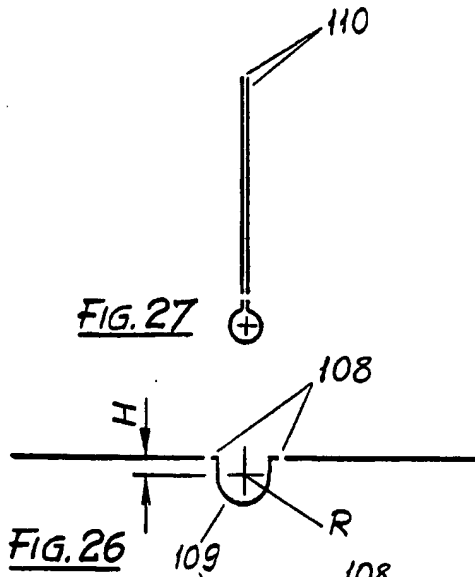
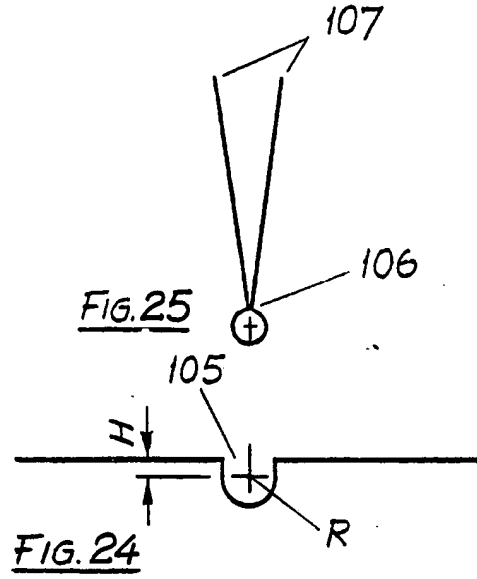
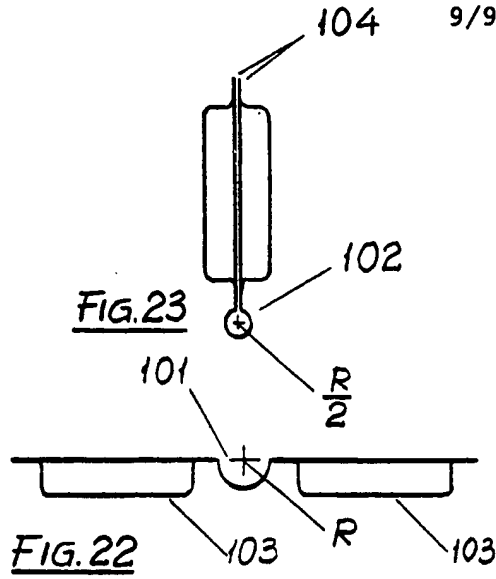



FIG. 28

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ A61J 1/03 According to International Patent Classification (IPC) or to both national classification and IPC					
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC ⁵ A61J 1/03, 1/00 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC as above Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT JAPIO					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.			
X Y	DE, A1, 4014811 (ORBKE) 14 November 1991 (14.11.91) see col 1 line 65 - col 2 line 9 and Figs 1,2 see whole document	1, 2, 5 3			
Y	GB, 757642 (COLE LTD) 19 September 1956 (19.09.56) see whole document	1-3, 5			
P,Y	DE, A1, 4101265 (ORBKE) 16 July 1992 (16.07.92) see whole document	1-3, 5			
<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. </div> <div> <input checked="" type="checkbox"/> See patent family annex. </div> </div>					
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%; vertical-align: top;"> * Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 33%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> <td style="width: 33%;"></td> </tr> </table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family				
Date of the actual completion of the international search 21 April 1993 (21.04.93)		Date of mailing of the international search report 29 APR 1993 (29.04.93)			
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  ANDREW DAVIES Telephone No. (06) 2832072			

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
A	US, 4911304 (BUNIN) 27 March 1990 (27.03.90) see whole document	1-5
A	GB,A, 2228922 (GORDON et al) 12 September 1990 (12.09.90) see whole document	1-5

Patent Document Cited in Search Report		Patent Family Member					
GB	2228922						
DE	4014811						
DE	4101265						
us	4911304	AU	51396/90	CA	2012516	EP	389207
		FI	901361	JP	3029765	NO	901263
		NZ	232877	PT	93496		

END OF ANNEX